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EDITORIAL DEPARTMENT NOTE

It is doubtful if the woolen industry as a whole has responded to the progress made in cost accounting, to a degree comparable to that of other major industries. In spite of the efforts of the Wool Institute and similar organizations, little recognition has been given by managers of woolen mills to the advantages resulting from proper cost accounting. There are, of course, exceptions to such a general statement as this and some mills have taken steps to develop simple, workable methods of control. Due to the rapidity of style changes and the lack of uniformity of raw materials used in the manufacture of much of our woolen goods, the accounting for waste and shrinkages in processing materials constitutes the most difficult phase of the problem. The Jefferson Manufacturing Company, a 100-loom mill at Jefferson, Massachusetts, has made a beginning in standardizing its costs, and the method of accounting for the raw materials is set forth in the first paper in this issue of our Bulletin.

Homer A. Lucas, the author of this paper, was graduated from the Boston University School of Business Administration, and was granted a C.P.A. certificate by the State of Massachusetts in 1924. He was a member of the firm of Stewart, Watts & Bollong, Public Accountants, for three years and for four years was a member of the staff of Peat, Marwick, Mitchell & Company, Public Accountants. At the present time he is Secretary and a member of the Board of Directors of the Jefferson Manufacturing Company, Jefferson, Mass., and a teacher of advanced accounting in the Worcester Division of Northwestern University. Mr. Lucas has been a member of our Worcester Chapter since 1926.

The second paper in this issue of our Bulletin concerns a phase of textile accounting about which very little has been published. Accurate cost accounting for the dyeing and printing of cloth is difficult because of the various types, styles, shades of color and manufacturing processes. The author of this paper has developed and installed cost accounting systems in several plants manufacturing and finishing cotton, rayon, woolen and worsted products.

Lewis F. Sawyer, the author of this paper, was graduated from Northwestern University with the degree of Bachelor of Commercial Science. He has been employed by the Pacific Mills in several positions of an accounting nature up to Chief Accountant. Mr. Sawyer has been a member of our Association since 1927 and is now a member of our Boston Chapter.

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JUNE 1, 1933

STANDARD WASTE ALLOWANCES IN THE MANUFACTURE OF WOOLENS

By Homer A. Lucas
The Jefferson Mfg. Co., Jefferson, Mass.

OF ALL the questions that agitate the mind of an accountant in a woolen mill, that of correctly figuring raw materials, shrinkages, and waste allowances, gives him by far the greatest concern. The problem in a woolen mill is perhaps more difficult than it is in other branches of the textile industry. This is due in part to the fact that materials do not run uniform, such as in the case of cotton, silk, and worsteds, and also because there is continuous experimenting and shifting from one kind of stock to another. Style changes have a more violent effect upon woolen fabrics than upon other textiles. A woolen manufacturer may make an entirely different fabric each season. It is probably true that the ablest manufacturers have specialized in a few lines of goods and as a result of long experience they acquire some advantages therefrom. It is also true that many mill operators are constantly changing from one line of goods to another, and are ready to make anything that seems to offer them an opportunity for a season's business. Present-day competition is vicious and certainly could not be called intelligent. Most mills today, large and small, are ready to shift on to the other fellow's lines if there is a remote possibility of profitable business, with the result that the woolen industry is strangling itself with unreasonable price cutting and all the attendant evils.

Even under such conditions a mill will often have an opportunity to do business if it can but meet a price, and the usual tactics in such a case after cutting wages and expenses to the bone is for the manager to manipulate the raw materials with substitutes and all kinds of makeshift stocks. Such a practice is peculiar to the manufacture of woolens for the reason that much of their raw material is classified as "shoddy." Someone once said that the object of a woolen mill is to make something out of nothing, and this comes near to being the case where a mill is using shoddy. This does not mean that the stock used is

not wool but that it is not virgin wool, or wool being used for the first time. Shoddy is the term applied to the stock resulting from passing tailor clippings, rags, and such materials through pickers, which separate the threads and reduce the material to its fibers. The use of the word "shoddy" to signify inferior materials is not always correct because there are many grades of shoddy, as well as of wool, and the better grades of shoddy are superior to the poorest grades of wool.

The cost accountant, when face to face with these conditions, will be impressed immediately with one fact, namely, that if his system of accounting for materials is to succeed and be of any value it must be first, last, and all the time, a simple one. To allow a system to become involved spells death for the system. And this is the important reason why the use of standard waste allowances and standard shrinkages is to be preferred over other methods of accounting for waste. While no attempt is made in this paper to discuss the technique of establishing standards, the problem does not appear to be a difficult one. The experiences of almost any mill would supply the necessary data if properly analyzed and tabulated, and there seems to be very few instances in which it would be necessary to engage outside talent. The following discussion is confined to the methods of using standard waste allowances for raw materials.

The Manufacture of Woolens

Woolen mills will differ in detail as to their equipment and manufacturing methods but the manufacture of woolen goods can be roughly divided into three main divisions:—

1. Yarn making
2. Warp dressing and weaving
3. Finishing

Yarn making includes, first, the mixing room, where the materials are blended in proper proportions; second, the card room in which the stock is passed through machines that clean and comb the fibers; and third, the spinning room where the fibers are twisted into yarns of required size and strength.

The warp dressing department receives the warp yarns from the spinning room and prepares the warps for the looms. Weav-

ing is of course the process where the warp yarns and filling yarns are woven into cloth.

Finishing is sometimes very simple and sometimes very complicated, depending upon the character of the fabrics. It includes such operations as sewing, fulling, scouring, dyeing, napping, shearing and pressing. All cloth is inspected, imperfections are repaired and finally the piece is bundled and tagged for shipping.

Most mills also have other departments, such as the stock dyehouse, in which the wool and shoddy are dyed before being mixed, and the picker department in which the shoddy is manufactured.

Raw Material Inventories

Ordinary perpetual inventory cards are sufficient to control the stores of wool and rags on hand. All bags and bales are tagged upon being received into stores and a stub of the tag is detached when they are requisitioned out of stores. A daily stock delivery sheet is made up from the stubs, which gives all information of kinds and amounts of material being delivered to work-in-process. The daily stock delivery sheets are priced at the time they are posted to the inventory cards and in this connection a comment or two may be worth while. No decided advantages have been found from numerous attempts to use standard raw material prices, with their accompanying schedules of purchase variations. The reason for this is because mill managers are usually their own purchasing agents, at least, in respect to raw materials. They also set the selling prices on the goods. The relationship between the cost of materials and the selling prices must be clearly kept in their minds at all times, and "in mind" is exactly what it is. Here again simplicity is the watchword. On one hand the price of wool may be going down and on the other a competitor may be cutting the prices on goods. The selling prices and profits per yard must at all times be known in relation to the market prices of raw materials. Such a relationship can be shown and kept in mind if done in an easy, simple way, but there is no time for calculating variations between standard material prices and market prices. Such schedules if three days old would be hopelessly out of date. Confusion resulted from an attempt to carry both a standard and cost price on the cards. Only one price therefore is carried on the perpetual inventory cards. In most cases this is the actual cost price. When

large quantities of wool are kept on hand, a declining market necessitates revaluations and in these instances the prices are changed to meet current market prices and the losses taken directly into an inventory adjustment account, which forms a part of the monthly profit and loss. From a managerial point of view it is advisable to avoid accumulating old stock and the first-in-first-out method of using up the stock is followed whenever it is possible to do so. This method of pricing is also followed.

A set of "Estimate Sheets" or "Cost Sheets" is kept on each fabric for each shade and for each combination of blends of stocks used. (See Figure 1.) These are constantly at the manager's elbow. They are so arranged that the effect of a change in raw material prices can be almost instantly calculated, and competitive selling prices may be met if it is possible to do so. On many lines of goods profits have vanished entirely, and while there seems to be little that can be done about such a deplorable situation, at least a manager must know each day and almost each hour exactly what the situation is. In order to simplify the estimate sheets to a point where it takes little more than a mental calculation to adapt it to new conditions in the markets, studies were made to standardize every element possible. Due to the fact that woolen manufacturing is a series of a few continuous processes no difficulty was encountered in establishing standard departmental manufacturing rates. It soon became plain that no standardization at all should be made in regard to raw material prices. It may not be entirely correct to state the case in this manner and our standard cost friends may prefer to put it that we do or should have a standard which is sufficiently flexible to meet market fluctuations. The important point is that estimates are continuously being revised for changing prices, while little if any changes are required in departmental manufacturing labor and expense rates.

Total Shrinkage of Materials

The cost sheets must have but one calculation which will give effect to the entire waste to be encountered in making a fabric. (See explanation of Figure 1.) Therefore the problem of waste allowances should be considered first from the viewpoint of the entire mill as a unit. As an illustration to be considered, the con-

COST SHEET

Mar ch 1st, 1933.

Style 150-80 32 oz. Overcoating — Finish Wgt. 32 oz.
Picks 48 - finished 53 - 54 — Loom Wgt. 36.80 oz.-2.265 lbs.
Ends 3600 — Shrinkage 10%
Width 78" on loom - finish 56" — Dead Loss 22%

Materials

BLEND		Price 2/1/33	Price 3/1/33	Cost of Mix 2/1/33	Cost of Mix 3/1/33
Warp 4%	White A Wool	.380	.400	.40	.40
16%	Grey B Wool - Colored Black	.300	.300	.372	.372
60%	Blue Worsted Clips - Natural	.175	.180	.192	.197
20%	Carbonized Blue Worsteds Navy Blue	.075	.080	.157	.162
				.221	.226
Filling (same as warp)					

Yarn Yield 92½%
Yarn Waste 6 %
Shrinkage 10%
Material Unit per Yard 2.89

Material Cost per Yard
Feb 1st .64
Mar 1st .65

Manufacturing

		Cost per Yard 2/1/33	Cost per Yard 3/1/33	Yard
Warp Yarn 2 1/2	Run @ .021			
Fill Yarn same	" .021			
	Unit 2.89	.265		
Spool & Dress	@ .036			
Weave 48 pick	@ .145			
	Shrinkage 10%	.200		
Burl & Sew .025	Pulling,etc.080			
Dry Finish .055	Dyeing ---			
Extras	Supplies .045	.175		
	Total Mfg'ing	.64	.64	
Total Material & Mfg'ing		1.28	1.29	
Administrative		.05	.05	
Total Cost		1.33	1.34	
Selling Expense		.16	.16	
Selling Price		1.62½	1.62½	
Profit		.13	.12	

Fig 1

Prices of raw materials changed between Feb. 1st and March 1st and the cost sheet was refigured on the new prices. The cost of the mix or blend was .221 and increased to .226. The material cost per finished yard is the cost of the mix times the material unit.

The material unit is found as follows:—

The shrinkage in finishing is 10%, therefore the loom weight of 2.265 pounds is 90% of a finished yard or 2.517 pounds per finished yard.

Yarn waste is 6% therefore 2.517 pounds is 94% of yarn required or 2.678 pounds of yarn per yard.

Yield is 92½% therefore, 2.678 pounds of yarn is 92½% of stock required or total stock required per finished yard is 2.89 pounds.

sumption of materials during a season's run on heavyweight overcoatings was as follows:—

White A Wool	275,000 lbs.
Gray B Wool	350,000 "
Fine Wool Noils	55,000 "
Mohair Noils	25,000 "
Blue Worsted Clippings	555,000 "
Fine Mixed Clippings	690,000 "
Brown Worsted Clippings	135,000 "
Old Carbonized Rags	365,000 "
Total	2,450,000 lbs.

These figures have been adjusted for any increases or decreases in inventories of stock in process at the end of periods. The cloth finished from this amount of stock was 1,898,000 pounds, or a gross loss of 32.5%. Of the waste produced, a certain amount was recoverable and put back into process by including it in blends for cheaper lines of goods. It, therefore, is included in the pounds of goods produced. A small amount was recovered which was not usable and sold as waste. The market price for such material is so low that the money value of such sales can safely be considered incidental and left out of our calculations. While over 32% may seem an exceedingly large amount to disappear in processing it goes almost without saying that the builders of textile machinery have applied their best engineering talent to the eliminations of waste, not only of the machines but in manufacturing methods. The problem for the mill accountant therefore becomes one of accounting for the 32.5% of materials lost. One line of fabrics might require a gross waste allowance of only 20% to 25%, another might require an allowance of over 35%.

Three calculations must be considered for changes in the weight of materials before lots are laid down in the mixing room, where production of yarn begins. These allowances are considered in determining the cost of the blend, or mix as it is called.

Tare

The tare on bales of clips and bags of wool is the first loss of weight. It is possible to take the bags of wool on a net pound basis

and eliminate this consideration at the start. Wool dealers allow a 3½ pound deduction on all bags of wool, which is reasonably accurate. Bales of rags will vary in weight from 700 to 1,200 pounds. Tests show the tare to be from 30 to 50 lbs. per bale, varying in accordance with the size of the bale. From this a simple schedule is easily worked out to apply the proper tare to any bale and to adjust the price per pound to the equivalent price on a net-pound basis.

Dyehouse Loss

Materials are delivered from the storehouses to one of three places; the mixing room, in case the stock is to be used just as it is purchased; the picker house, as in the case of rags and materials for making shoddy; and the stock dyehouse, for materials that must be colored before being used. There is debate among superintendents and overseers as to the proper allowance for dyehouse losses. The dyehouse overseer if ordered to deliver 1,000 lbs. of wool dyed navy blue to the mixing room will draw from stores 1,100 lbs. as he estimates his shrinkage to be approximately 10%. Tests will bear him out and his error lies in the fact that the stock dryer delivers the dyed stock in an overdried condition in which case it will pick up considerable moisture from the air and thus gain in weight as it is exposed to the air. An analysis of many experiments show that a clean, scoured wool will not loose over 3% in weight on light shades and less than 1% on black and very dark shades. A schedule is used to increase the price per lbs. for dyed stock on account of this loss in weight. New worsted clippings will lose very little. In fact, some experiments have shown a very slight gain in weight on black and dark colors.

Picker House Increase

Due to the oil and water emulsion poured on the rags before they are picked, a gain in weight will be reported by the picker house production sheets. However, a set formula is followed at all times in oiling the rags and therefore little if any variance is found in the moisture content of the shoddy. Careful tests enable us to establish a rate of 18%. It is possible to tag the bags of shoddy on a net-pound basis thus eliminating this calculation from our pricing. In case the shoddy is tagged a gross weight, a lot in

the mixing room specifying 100% shoddy would require 121.95 lbs. in gross weight, which less the 18% would give the 100% of stock. Due to the possibility of some drying out occurring before the lot is mixed, and thus an error arising in the pounds of the

MIXING REPORT

LOT NO. 345 STYLE 150-80

COLOR #43 Mix - Blue Oxford

WARP FILLING RUN 2 1/8

WEIGHT	Stock NO.	MATERIAL	UNIT PRICE	AMOUNT
200	#30	A Wool - White	.40	80.00
800	#20	Grey B Wool-Navy Blue	.373	298.40
3000	#100	Blue Wstd Clips-Natural	.197	591.00
1000	#110	Carbonized Wstd Clips-Navy	.162	162.00
5000				1131.40

PRICE PER POUND .226

DATE MIXED March 1, 1933 DATE OF ORDER Feb. 28, 1933.

Fig. II

lot, it has been found that more accurate results follow if when bagging up the shoddy it is tagged on a net-pound basis.

Of the three changes in the weight of materials up to this point, only the tare and the dyehouse loss need be considered in following the illustration, as all picker house weights are net.

While mills will differ in regard to the methods of handling raw materials, these three changes in the weight of stock will run very uniform and occasional tests and checks will verify the standard allowances which are being used. These allowances must be considered in pricing a lot of stock in the mixing room.

Pricing the Lot

Each yarn production order requires a lot to be laid down in the mixing room. A mixing room report on each lot mixed is shown in Figure II. The unit prices per pound are arrived at as follows:

	Cost	Tare	Dyehouse Shrink	Dye-stuff	Stand. Picking	Mfg'ing Dyeing	Unit Price
A Wool White (Natural).	.40	...	...	....	...	...	.400
B Wool Gray (Navy)	.30	...	2%	.0320	...	.035	.373
Blue Wstds. (Natural)	.18	5%	...	....	.008	...	.197
Carb. Wstds. (Navy)	.08	4%	1%	.0325	.008	.030	.162

The cost of the 5,000 lbs. of stock for warp yarn on this lot is therefore $1,131.40 or .226 per pound.

Yield in Yarn of Lots Mixed

A manufacturer looking back over 40 years of operating a woolen mill once said that the only two record books absolutely essential to running his mill were his check book and his lot book, and sometimes the check book did not amount to much. While somewhat exaggerated, of course, such a statement shows the attitude of mill managers toward the yields of yarn which are being made. As new fabrics are being put through or as changes are being made in the blends of old ones, it is necessary to establish fairly accurate standard yields, and once set they require constant watching and sometimes much revision. The 5,000 pounds of stock in the lot used in the example above will be mixed, carded and spun into yarn before an accurate weight for yield purposes can be obtained. Spinning room production records give the most accurate weights of yarn made, and the yields are shown by the Lot Book, an illustration of one page of which is shown in Figure III. The book is simple, and includes but a record of pounds of yarn produced from each lot mixed, with the percentage of loss and any usable waste produced. Our example of Lot #345 shows a yield of 94.6% and Lot #346 which is the same, as it is Mix #43 and similar in every way to Lot #345 except that it is being made

LOT BOOK

Lot 345 Mix # 45 Run 2 1/8	Mule 6-8 Card 14-15 Warp	Lot 346 Mix #43 Run 2 1/8	Mule 18-19 Card 8-9 Filling	Lot 347 Mix #100 Run 1	Mule 3 Card 12 Warp
MIXED 5000 lbs		MIXED 5000 lbs		MIXED 6000 lbs	
Mar 3 125 lbs " 3 455 " 4 451 " 4 842 " 4 1240 " 6 240 7 1240 " 7 125 " 8 5 " 8 5		Mar 6 220 lbs " 6 320 " " 7 550 " " 7 700 " " 8 620 " " 8 680 " " 9 740 " " 10 430 " " 11 330 " " 12 100 "		Mar 1 700 lbs " 1 1032 " 2 1240 " 3 1430 " 4 1018 " 5 10	
YIELD 4726 % 94.6 WASTE -0-		YIELD 4690 % 97.8 WASTE 200 lbs		YIELD 5430 % 90.5 WASTE -0-	
Lot 348 Mix #100 Run 1	Mule 10-11 Card 5-6 Warp	Lot Mix Run	Mule Card Warp	Lot Mix Run	Mule Card Warp
MIXED 7200 lbs		MIXED		MIXED	
Mar 3 650 lbs " 3 810 " " 4 1010 " " 4 1240 " " 6 1180 " " 7 870 " " 8 590 "					
YIELD 6350 % 88.2 WASTE -0-		YIELD % WASTE		YIELD % WASTE	

Fig III

for filling yarn, shows a yield of 97.8% due in part to 200 pounds of usable waste. In spite of the best of supervision it is possible that Lot #345 should be credited with some of the 200 pounds of waste as both lots were run side by side and at the same time, and in setting the standard yields to be used averages of a number of similar lots must be used. The yield on Lot #347 is only 90.5% as it is a different kind of stock for a different fabric. A variation between lots from 85% to 98% is not unusual. The lot book supplies the manager with esential information as to the character of his materials. It supplies the accountant with the actual yields of yarn on lots mixed to check against the standards.

A report is sent each day to the superintendent showing the yield on all lots completed and immediate investigation is made of any extraordinary losses. At the end of the month a summary of lots mixed shows the results for the month and shows a computation for any loss on the yield in excess of standard yields. (See Figure IV.) This amount is taken from the work-in-process accounts each month and is considered a monthly profit and loss item. At the end of a season, usually at the end of each six months' period, the monthly summaries are totaled and used in checking with the gross loss on all stock put through for the period.

Yarn Waste

Where spooling, twisting, and dressing of warps are operated as separate departments, separate waste reports will be used and separate calculations may be made. In many cases the dressing room and weave room will be so close together as to eliminate any chance of keeping the waste separated. Also there will be times when special reports will be needed for special operations, such as extra twisting, but in general and for most purposes one waste allowance will be sufficient to include spooling, dressing and weaving, which may be called yarn waste. Here again if accurate standards are determined for each kind of work, little variation will be found in actual results. The reports of actual waste produced in these rooms are summarized and kept in memorandum form for purposes of supervision. Only in very rare instances have the differences between the actual values of yarn waste and the standard allowances been large enough to warrant taking them

SUMMARY OF LOTS MIXED

Month of FEBRUARY

	MIXED					YIELD						
	Mix or Color	Run	Pounds of Stock	Amount	Cost per lb	Pounds of Yarn	Actual %	St'd %	Gain %	Loss %	Amount Gain	Amount Loss
	#43	2/8	20,000	$4461.10	.223	18,565	98.8	92.5	.3		$15.66	$ -
	100	1	12,000	2220.50	.185	10,677	89	90		1.	-	35.28
	110	1	12,000	2219.50	.185	10,622	88.5	90		1.5	-	36.58
	250	3	30,000	9451.15	.315	28,650	95.5	95	.5		49.67	-
	260	3	24,000	7559.75	.315	22,750	94.8	95		.2	-	16.56
	310	1½	15,000	3900.85	.260	13,515	90.1	92.5		2.4	-	101.20
	311	1½	17,200	4385.90	.255	15,580	90.6	92.5		1.9	-	90.98
	312	1½	16,000	4240.00	.265	14,455	90.2	92.5		2.3	-	104.57
											65.33	375.17
												65.33
										Net Loss		$309.84
						Fig 1V						

into the monthly profit and loss account. Where automatic looms are used on low count work, the yarn waste may go as high as 8% of the total yarn consumed. On fine yarns and a good running work it may be as low as 4%.

Shrinkage and Dead Loss

The final loss in weight occurs in the finishing room. It is the difference in weight between the cloth off the looms and the cloth at the finishing room perch. This is known as dead loss. It will vary widely between different fabrics in accordance with the quality of raw materials used and the amount of fulling, napping, shearing, etc. The finishing room production reports (See Figure V.) are summarized each day and this summary shows the dead loss on each style. The illustration of five pieces each of style #150-80 and #325-2 shows the dead loss to be 19.3% in the first case and 26% in the second, and even a wider range than this is sometimes encountered. In the process of fulling, the cloth undergoes a shrinking thereby increasing the weight per yard of the finished goods, and it is the shrinkage which is of significance in estimating and figuring the cost of goods. Under the best of conditions, goods will not run uniform and the gain or loss on shrinkage is an instance where the variation between actual and standard must be considered monthly. In the illustration on Figure V., the five pieces of style #150-80 had a shrinkage fo 9.4%, the standard as per the cost sheet being 10%. The manner of determining the gain or loss from standard for a month would be as follows:

Assume the finishing production for a month to be:

Pieces	*Style*	*Yards Finished*	*Woven Yards*	*Actual Shrink*	*Standard Shrink*
500	150-80	20,300	22,430	9.5%	10%
1000	325-2	35,500	48,000	26 %	24%

Mill cost on #150-80 per cost sheet $1.29
" #325-2 (assume) .90

No. 150-80	finished yards	20,300	
	90% of 22,430 =	20,187	
	Gain	113 yds. @ 1.29	= $145.77
No. 325-2	76% of 48,000 yds. finished	36,480	
		35,500	
	Loss	980 yds. @ .90	= $882.00
		Net Loss	$736.23

Finishing Room — DAILY REPORT

March 13, 1933.

PIECE NO.	LOOM	WARP LOT	WEFT LOT	PICK	YARDS	WEIGHT YARD	WEIGHT PICK	STYLE	FINISHED YARDS		SHRINKAGE	NET YARDS	WEIGHT PER YD.	WEIGHT lbs.	TEST	REMARKS	SECONDS	SEAMING	
2050	40	345	346	48	46 ⅛		102	150-80	-		-	39 ⅜	32.2	80½					
2051	"	"	"	"	46		104	"	-		-	42	32.9	86					
2052	"	"	"	"	45		103½	"	-		-	41 ⅛	32.1	83					
2053	"	"	"	"	44 ⅞		101	"	-		-	40 ⅜	31.9	81½					
2054	"	"	"	"	46		103½	"	-		-	42 ⅛	32.3	86					
2060	50	348	349	28	46 ⅛		96	325-2	-		-	35	31.7	71½					
2061	"	"	"	"	45 ⅛		95½	"	-		-	35 ⅛	32.3	70					
2062	"	"	"	"	47		96⅞	"	-		-	36	32.8	71					
2063	"	"	"	"	46 ⅛		95	"	-		-	35 ⅜	32.1	70½					
2064	"	"	"	"	45		95	"	-		-	36 ⅛	31.8	71					

SUMMARY

	Pieces	Woven	Finished	Dead Loss	Shrinkage
Style 150-80	5	227⅛ yds. 814 lbs.	206⅛ yds. 410 lbs.	19.3%	9.4%
" 325-2	5	230 yds. 478 lbs.	177 yds. 354 yds.	26 %	20.4%

Fig. V

A similar schedule should be figured for gain or loss from standard on the weight of goods from the looms. Often extra shrinkage is given to make up a deficiency in the loom weights, the loss in one instance simply offsetting a gain in the other.

Summary

The following allowances have been considered:

	Approximate Maximum	*Approximate Minimum*
Considered in cost of Mix		
Tare	5%	3%
Dyehouse	3%	0
Considered in Material Unit per yard		
Loss on Yield	15%	2%
Loss on Yarn Waste	8%	4%
Dead Loss	26%	19%

In the case of cloth made with the maximum allowances, 100 pounds of stock will produce 53.3 pounds of cloth and another fabric under the minimum allowance will produce 73.7 pounds of cloth, one case showing a gross loss of 46.7% and the other 26.3%. Going back to our illustration of total pounds of stock used with a gross loss of 32.5%, it remains but to assemble the production in yards of all styles produced during this period and apply the standard allowances for each style and check to the 32.5%. This is by no means proof of the accuracy of all allowances used but it serves as a very good check. Special considerations must be given to peculiar conditions which may enter the picture at any time and additional waste allowances may be made at any point.

One further comment should be made regarding the use of standard waste allowances in a woolen mill. As time goes on and as the experience and skill in determining accurate standards increase, the management places more and more reliance upon them and less upon any table of actuals. In fact the standards come to be considered more nearly actual than any monthly schedule of so-called actuals. It may be argued that such standards as these are not proper standards in a strict sense of the word and are nothing more than a set of good averages. However, this much must be admitted in their favor, so far they have worked.

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STANDARD COSTS IN DYEING AND PRINTING OF COTTON FABRICS

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THERE are many complications and problems incident to the application of cost accounting theory to the requirements of the dyeing and printing industry. With the innumerable shades, patterns and finishes which comprise the product, many variations in production methods exist and consequently a large amount of cost detail may be experienced.

Standard costs are particularly suitable to this industry for they offer a simple, economical means of gauging the efficiency of operation, and they provide a control over the multiplicity of cost details. In attempting to describe the procedure incident to the installation of standard costs, it is necessary to emphasize that the benefit to be obtained is in direct proportion to the practical development of the methods to suit the needs and policies of the individual concern. This discussion must therefore consist of a general description of the subject and omit reference to the matters of routine procedure, such as payroll methods, handling of materials, and the like.

This industry is divided into two broad classifications: (1), commission finishers, whose production activities consist of the conversion of cloth belonging to other concerns; and (2), finishers who work wholly upon their own cloth. The commission finishers' market quotations are based upon the finishing of individual lots and the prices are graded upon the size of run, class of work, depth of shade, and the type of pattern, and include a certain guaranteed outturn in finished yards. The cost of the cloth consequently does not play an important part in the records. The manufacturers operating their own finishing plants have the same processing cost variations and in addition have the investments in gray cloth and finished inventories to consider, and the market prices are based upon the cost of the cloth in the finished state. The accounting records should be set up in such a manner that the manufacturing, finishing, and selling activities may be segregated with the cost calculations being divided in a like manner. This

places the cost accounting of the two classifications upon a similar basis and the costing becomes a matter of isolating the expense incident to each process so that, through the analysis of the finishing specifications, the amount of cost applicable to each product may be ascertained.

A review of the processing methods will disclose that many of the processes are used for all classes of product and at about the same operating speed for each of them, while several of the processes are used only on certain types of finishes and at varying rates of speed for each class. In some instances, the time for preparing the machine for each lot is nearly as great as the actual time taken in productive operation and the size of the order, therefore, has an important bearing upon the cost per unit; while in other processes successive lots of goods are merely sewn together and the machine is in nearly continuous operation. The processing methods are somewhat flexible and it is usually possible to produce the same shade through either of several methods of dyeing, the size of the order being the determining factor in most cases. Since these cost variations result from variations in size of the orders, and since selling prices are set accordingly, it is necessary to set up cost standards based upon orders of varying sizes, but it is necessary to consider these variations only for those processes where the production speed and method are affected.

An analysis of the expenses will disclose that they may be very readily classified and grouped in such a manner that their relationship to the processes and to the time required for the operation may be identified. Through the classification of each item to either labor, material or burden it is possible to maintain the identification and establish cost standards which makes possible the comparison of actual operating expenses against the standard expense, in proportion to the production and in a way that the amount and cause of the deviation may be recognized. Labor should be considered to be composed of the productive labor, which may be identified to indivdiual processes and which is controllable with the amount of production. Material consists of chemicals, dyestuffs, etc., which are identifiable to the different products and which are consumed in direct proportion to the amounts of each produced. Burden includes the mill operating expenses and covers the items related to the investment in equipment and its maintenance, super-

vision, and management expense, all of which is in the nature of constant expense regardless of the amount of plant operation, with steam, power, and supply cost comprising those burden items which fluctuate with the amount of production.

It will be observed from this analysis of the expense, that fluctuations in the cost per production unit will occur with the increase or decrease in the amounts produced, and with the ability of the management to control the amount of expense. The foundation of standard costs, however, consists of setting of objectives, covering each element which affects the costs, and considering any deviation from these standards to be a profit or a loss, rather than a variation in the cost of the products. The usage of plant capacity has an important bearing upon the production costs and the determination of a standard basis of operation should be made through consideration of the marketing policies and in such a manner that the expected amount of operation would assure the absorption of the expense during a complete business cycle. In this manner, losses due to unused facilities and profits due to overtime operation will be segregated and should be considered in the coordination of the manufacturing and selling activities.

In a plant of this nature, with a variety of products affected by style and seasonal changes, it is not possible to operate all of the processes in balance. A review of the operating records and consideration of the relationship of the individual process to the rest of the plant, will indicate the percentage of operation which may be expected of each process. It would be very difficult to attempt to budget the operation of each process through an analysis of a budget of finished products, as may be done in some other industries, but through comparison of the records of past performance and consideration of anticipated marketing conditions, it should be possible to arrive at a standard operating basis, for each process, in a simple and satisfactory manner.

The various cost factors included in the establishment of the burden cost standards present some very interesting problems, for the amount of burden depends somewhat upon the amount of plant operation and the proper allocation of the expense to the individual processes may become difficult because of the lack of a means of measurement. Each class of expense should be budgeted at the amount expected during a period of normal operation and in a

manner that allows for budgetary control over the expenses as they are incurred. Periodic reports should be presented, covering the comparison of the actual expenses with the budget and an analysis made of the variations. (Exhibit 1.) While the budget

(*Exhibit 1*)

BUDGETED EXPENSE

Total Budget $100,143.00 Month of
Earned Burden 110,268.21
% Operated 110.

Account	This Month Budget	Actual	Variance	Allowed	To date for Fiscal Period Budget	Actual	Variance	Allowed
Administrative								
Payroll								
Supplies								
Repairs								
Telephone								
Traveling								
Legal								
Dues								
Donations								
Automobiles								
Payroll								
Supplies								
Repairs								
Steam								
Payroll								
Supplies								
Repairs								
Fuel								
Power								
Payroll								
Supplies								
Repairs								
Purchased								
Dept. Supplies								
Dept. Repairs								
Indirect Labor								
Supervision								
Taxes								
Insurance								
Interest								
Depreciation								
Total								

This abbreviated form is to illustrate the type of a report which would be used in connection with the Budgetary Control of Burden. It is self-explanatory with the possible exception of the calculation of the allowed variations in the variable expenses. These calculations would be based upon the difference between standard and actual operation and as the total Budget is representative of standard operation, the total amount earned at the machine hour rates (Exhibit 7) may be considered to be proportionate and the per cent operated would be in this ratio. From the computation, noted above, it will be seen that during this month the plant operated at 110% of standard and that the allowed variances would be 10% of the budgets.

might have been based upon the predetermined basis of operation, it is possible to measure the variations, in accordance with the actual operating conditions, by calculation of the allowed variations, which are proportionate to the difference between standard

and actual operation. In connection with the use of budgetary control, it will be found that the comparison of expenses may be more effectively used, on such items as power and steam, if the amounts consumed are metered, at key points, as these expenses are subject to wastage if not properly supervised, and it has usually been found that a distinct saving may be made through this means. Those expenses which may be readily identified to individual processes should be budgeted for each process in building up the budget, and the remainder of the expense must be allocated to the processes in as equitable a manner as possible. The budget may be set up to agree with the fiscal period, but in making the distribution, it will be found to be advantageous to convert it into a budget for one day, so that the calculation of the machine hour rates may be easily made, and so as to provide the basis for the periodic comparative reports.

The calculation of the standards is based upon machine hour expense in most of the processes, but in some cases, such as Ticketing, the basis may be an employee hour, and in operations like grey storage, the standards should be based upon a day's expense and production. The number of machines comprising each process center, multiplied by the daily plant operating time and by the standard per cent of operation, equals the daily standard operating hours which should be divided into the process budget per day for the standard machine hour rate. This rate is then divided by the standard operating speed for the standard burden cost per yard. In those instances where there may be a variation in speed with different classes of products, it will be necessary to divide by the standard speed, as set for each product, to obtain the standard cost of each class. (Exhibit 2.)

(Exhibit 2)

CALCULATION OF COST STANDARDS

							Plant Operating Time 10 Hours			
		Standard		Budget	Machine	Rates			Standards	
Process	*Machines*	*Per Cent*	*Hours*	*Per Day*	*Burden*	*Labor*	*Class*	*Speed*	*Burden per 1,000 yards*	*Labor*
Grey Storage			10	$ 74.36	$7.440		All	30,000	$ .2480	
Singe	2	75	15	30.75	2.050	$ .30	"	4,000	.5125	$.075
Bleach; Kiers	10	150	150	275.20	1.840	.10				
" Open	30	150	450	127.33	.283	.04				
White Driers	4	95	38	98.52	2.540	.43	"	4,800	.5290	.090
White Tenter	1	75	7.5	15.00	2.000	.37	1	1,500	1.3333	.246
							2	1,000	2.0000	.370
							3	500	4.0000	.740
White Winders	2	60	6	3.36	.560	.24	N	4,000	.1400	.060
							W	3,000	.1867	.080
Printing	8	95	76	601.92	7.920	2.38				

This is only a partial list of the processes and is furnished as a demonstration of the calculations, the machine speeds and expenses being purely arbitrary figures. In some of the processes it would be necessary to make the calculations so that the conditions pertaining to the process may be efficiently accounted for, as in the following instance.

Cloth may be bleached through the use of several methods and may consist of a simple scouring operation or of lengthy and duplicate processing, the method used being dependent upon the type of color and finish to be eventually given to the cloth. The principal operation consists of boiling in the kiers, in caustic or peroxide solutions, and in souring and steeping in a series of pits, with a washing operation before each process. A review of the processing methods would indicate the principal type of bleach used and in order that the costing may be simplified, through the consolidation of several operations into one process center, this product may be considered to be the standard and that the costs of the other products would be in proportion to the processing time used. After the calculation of the machine rates, the following calculations would be required, having the effect of costing the production on a standard pound basis.

	KIERS					OPEN BLEACH				
				Standards					Standards	
Class	Kier Hours	Cost Per Cent	Weight Ratio	Burden	Labor	Pit Hours	Cost Per Cent	Weight Ratio	Burden	Labor
1	10	100	100	.184	.010	20	100	100	.566	.080
2	25	250	40	.460	.025	40	200	50	1.132	.160
3	5	50	200	.092	.005	10	50	200	.283	.040

The process of bleaching being computed on a weight basis, it would be then necessary to adjust these costs to a yardage basis before consolidation with the other process costs.

Standard speeds should be based upon time studies, but allowance must be made for lost time incident to the changing over between lots and for stoppage caused by minor adjustments. These standards should be set through the cooperation of the production supervisors and as the speed of production is the keystone of the cost calculation, accurate production records should be maintained and comparative data presented periodically with emphasis being placed upon the importance of the maintenance of production at or above the standard speed.

As the labor connected with each process may be readily identified, it is a simple matter to arrive at a labor cost per machine hour which can be divided by the standard production speeds to obtain the standard labor cost. As the labor cost is presumed to be in direct ratio to the amount of production, the standard labor costs may be used as the basis of a flexible budget and through multiplying them by the amounts of production the total budget is made available for comparison against the amount of payroll.

The segregation of the cost information, applicable to each process, allows for the periodic preparation of a simple report on which all of the data may be entered in a condition which concisely compares the actual operating results with the budgets, thereby disclosing the efficiency of operation. This form may be prepared so that the budgets may be compared to the expenses incurred, and the standard speed and labor cost of each product compared against the current results. Through the presentation of this information to the production supervisors and their analysis of the variations, this report should secure their cooperation in the cost activities, and serve as a valuable means of cost control. (Exhibit 3).

There are several factors involved in the calculation of the standard cost of materials and in the comparison of the consumption at standard against the actual expense. With the fluctuation in purchase prices, it is not advisable to attempt to recalculate constantly the material standards so they will always agree with the market prices, and the standards should therefore be based upon standard market prices. The amount of variation, however, should be determined frequently, so that any wide differences may be discovered and corrected. This may be accomplished by comparing the cost of materials consumed at both the standard and actual purchase price.

The forms used in recording the standard formulae may consist of a simple notation of the amounts and cost of materials per mix on such processes as bleaching, where the materials flow from storage tanks into the kiers, or they may consist of complicated forms on which the amount of each class of material and information pertinent to each lot may be entered, as in the cases of the dyeing processes. With the necessity of accurately compounding the materials used in dyeing, it is essential that written instructions be given to the operator covering each lot, and the use of a definite

(Exhibit 3)
COST RECORD.

Department Overseer.

DEPARTMENT BUDGET

Month	Direct Labor Standard	Direct Labor Actual	Direct Labor Budget	Indirect Labor Budget	Indirect Labor Actual	Supervision Budget	Supervision Actual	Supplies Budget	Supplies Actual	Repairs Budget	Repairs Actual

Remarks

PROGRESS PRODUCTION RECORDS

Mo.	Machine Hours. Total	$	Over time	%	Standard Speed	Labor Cost	Actual Production by Classifications. Hours	Prodn	Speed	Labor Cost	Hours	Prodn	Speed	Labor Cost	Hours	Prodn	Speed	Labor Cost
Process						%	Class				Class				Class			
Process						%	Class				Class				Class			
Process						%	Class				Class				Class			

form makes it possible to compare the formulae as used with the standards and to makes changes in the cost records where necessary. The form used in recording the color used for printing is usually arranged so that the statistical information pertaining to the lot is provided for at the top, with the bottom section divided to indicate the rollers to which the various colors apply and the arrangement of the individual color combinations. While the material costs are calculated from the information appearing on the formula forms, it is necessary to make allowance for the waste and leakage in order that this expense may be included in the production cost, and standard allowances should be worked out in accordance with the conditions applicable to the individual processes.

The color used for printing is applied to the cloth in a paste form which is compounded through the combination of basic pastes with sufficient addition of neutral printing gums to regulate the depth of shade. All of this information is recorded in a simple method of abbreviation and coding through which it is possible to calculate the cost of material applicable to each lot. The calculation of the cost of color consumed is complicated however by the necessity of keeping the color pans on the printing machine full, and while in some cases only a small portion of the color may be applied to the cloth, the color must be available until the lot is completed, at which time the excess is returned to the color room for disposal. In some cases it is possible to use up these excesses through combining with basic pastes, but on some classes of color this is not possible and it is therefore wasted.

A similar condition exists in connection with the sizing materials used in the finishing processes, for the material is compounded through formulae suited to the individual finishes and in quantities proportioned to the yardage. It is necessary to have a sufficient amount in the starch mangles to allow for an even distribution on the cloth and upon the completion of the run there is always an amount left over. It is not always possible to use this excess material, and as it spoils quickly there are some quantities discarded.

In setting up the standard allowances to cover the cost of wasted materials, it is necessary to consider this salvage element so that the calculation, made to establish a standard material cost for each unit of production, will be based upon the eventual cost rather than upon the exact formulae. As the material cost covers a large

proportion of the total cost, it is very important that a definite means of controlling the cost of wasted materials should be used. While this could probably be accomplished through proper supervision, the use of standard costs will serve as a gauge that indicates the effectiveness of the control over materials consumption. Through frequent calculation of the total standard cost of materials consumed, and comparison with the actual total cost of consumption, the amount of variance may be ascertained and analyzed to discover the reasons and possible improvements in methods.

While the tendency is to arrange the processing methods so that straight-line production methods may be effected, there still are some processes in which the goods are given several runs of the same machine. This is noticeably so in jig dyeing, for this process consists of the rerunning of the cloth through the liquor until the desired depth of shade is obtained. While the machine automatically reverses and cares for this rerun, the cost is dependent upon the number of runs given each shade. In order that this variation may be cared for in a simple manner, the cost for a single run should be calculated and this may be used as the base in computing the cost of the individual shades.

In some processes, the opposite of this condition is in effect, for it is possible to arrange the equipment so that two or more strings of cloth may be run at the same time, thereby reducing the cost of single running. This is dependent upon the nature of the cloth and in order that the cost may properly be apportioned, it is necessary to establish a base cost for a single run and adjust this cost for those products which benefit from the dual operation.

The amount of expense connected with the printing process is usually very large and the efficient operation of this process consequently has an important effect upon the total cost. There are several distinct operations involved in the printing of each lot and during a large part of the time the machine is stopped. These operations consist of such matters as installing the rollers, adjusting for proper registration, checking the correctness of the color, adjustment to machine equipment and productive operation. With each change in the color combinations, it is necessary to repeat some of the non-productive operations and at the end of each day it is essential that the machine be partially stripped and thoroughly cleaned. These elements have a very marked effect upon the cost

of each lot and because of these unavoidable stoppages, the cost per yard is reduced with increases in the size of the runs. As this process constitutes the "neck of the bottle" for the major portion of the plant, effective means of decreasing the machine stoppage, and thereby increasing the productive speed, should be considered as a good investment. Machine time records should be used for each order on which the time taken for each operation may be reported. From this source and from time studies, standard time allowances can be established which may be used as the basis of wage incentives and in setting the cost standards for the runs of various sizes. (Exhibit 4.)

The commission finisher escapes the necessity of considering the cost of engraving the designs on the copper rollers, as they are the property of the customer and are furnished to the finisher in the same manner as the cloth. The manufacturers that operate their own finishing plants have this element to include in the market price of the finished cloth, and it is necessary to add to the finishing cost some amount to cover this expense. As these designs are prepared, prior to the beginning of each season, the cost of the design should be apportioned over the expected sales and a standard cost established to apply against each yard produced by the design.

The treatment of the cloth in process includes wetting out and drying, at several points, which loosens the fibers in such a manner that the cloth becomes somewhat elastic and the yardage at any process is not in agreement with the grey yards delivered into process or with the finished yards. The processes incident to bleaching will cause a stretch of approximately four per cent, but this is partly lost in the finishing processes, so that the average stretch from the grey to the finished state will be in the vicinity of two per cent. This will cause a variation in the yardage recorded on the yardage counters at intermediate points, from the yardage shown by finished production. On the other hand, certain finishes are treated in such a manner that a loss in yardage will result, which on some cloths will be as high as fifteen per cent. As the cost standards are based upon the cost of handling at the individual processes, it is necessary to care for this element in accumulating the total standard cost of each product. This should be done by determination of the points which are in error and the

(Exhibit 4.)

PRINT MACHINE TIME CARDS

Order No._____ Cloth No._____ Pattern _____

Date_____ Mach. No._____ Operator_____

Yards Ordered

Comb'n.	Yards

Machine Time

Allowed _____ Std. Speed _____

Taken _____ Act. " _____

Gained _____ % Std. " _____

Approved by:

Lost _____

Bonus _____

Bonus Rate _____

Clock Record	Time	Allow	Gain	Loss	Operation Comb.	Yardage
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						
Start						
Stop						

percentage of same, so that standard cost may be adjusted to the finished yard basis.

It will be observed that, with this element of stretch, the waste factor is not as noticeable as in some industries, but there are certain losses due to this cause. Seam ends, misprints, misdyes, and damaged cloth constitute the principal items and while some of the waste is unavoidable, the amount may be reduced through study of the causes and correction of the processing difficulties. With the guarantee of a definite outturn made by the commission finisher, any loss of cloth below the guarantee is paid for by the finisher. On the other hand any yardage above the guarantee is retained, and the income from its sale offsets the losses made. The application of this theory to both classes of finishers, and the adjustment made to the cost standards for the amount of stretch, cares for this factor in the calculation of standard costs, but it is essential that definite records be maintained to substantiate the theory and to serve in the control of waste.

During the processing, it frequently becomes necessary to rehandle the cloth to correct damages and processing errors. This refinishing expense should be controlled, as far as possible, through proper supervision, as under ideal conditions it would be avoided. This expense should be segregated in such a manner that the source and cause of it may be identified, and the information used in avoiding similar troubles. As the cost standards for each process would not include this expense, it would be necessary to add a sufficient amount to the cost of each class of product to allow for it in the total standard cost.

One of the main advantages in the use of standard costs is that it focuses attention upon the variations in expense at the source rather than attempting to ascertain the amount of fluctuation in the cost of the individual products. This allows for a definite means of analysis and control of cost, and substantially reduces the amount of clerical work in the computing of product costs. The standard cost of each product being the accumulated cost of its components, the cost sheets should be arranged in such a manner that the specifications may be clearly identified to the processes used, and so that the calculations may be made efficiently. (Exhibit 5).

(Exhibit 5.)
COST SHEET.

CLOTH NAME		
DEPT.	FIN. WIDTH	CLOTH No.
CONSTRUCTION	STRETCH	CLASS DYESTUFF
S. Y. O.	SHRINK	CLASS COLOR
FINISH	SIZE ORDERS	METHOD
PUT UP	ESTIMATE No.	DATE

	DEPT.	OPERATION	STD DOZ	DIRECT LABOR	BURDEN	DIRECT MATERIAL	SUB TOTAL	%	SHADE CLASS	SHOP COLOR	JOB COST	DYESTUFF	TOTAL
		This form is designed so that the basic cost may be assembled in the left hand columns, to which would be added the costs, incident to the individual shades, as they appear in the columns at the right, for the total cost of each shade. It is also arranged so that the various shades may be grouped in the various cost classifications, and also so that a weighted average cost may be computed in accordance with the predetermined percentage of each shade in the sales budget.											

Each class of product is composed of the same kind of cloth, which is given the same type of finish, but in several shades of dyed coloring, and in printed patterns of various color combinations, with some variation in the type of fold and packaging of the finished goods. The methods of processing are such that each shade is given the same treatment with the exception of the processes connected with the application and development of the color, and in the final packaging. In order that duplications in clerical work may be avoided and the cost of the line collected in a comprehensive manner, the cost sheets should be arranged so that the basic cost of the processing may be segregated, to which can be added the cost of the processes in which the variations occur for the total cost of each shade. This arrangement of the cost sheets also allows for the adjustment in cost occasioned by the lots being of various sizes.

The selling policies of the two classes of finishers must be considered in the setting of the standards covering the various classes of product, for in neither case are the prices established upon individual shades or patterns. The commission finisher classifies the individual shades into groups and sets a price for the group, making an additional charge for packaging. The manufacturing finisher sets a price for the entire class of product, including the packaging, and arrives at the price through averaging the costs.

It may appear that there is a lot of complicated figuring connected with the computing of the standard costs, but it will be found to consist of simple calculations and that, in some cases, the difference in cost may be so negligible that averages may be used to combine several standards. It should be remembered, however, that the purpose of making these calculations is to collect the information in such a manner that a profit may be obtained, and if losses are being made on any product, it is essential that the situation may be discovered and remedied. Through the use of standard costs it is possible to build up product costs in sufficient detail to be able to analyze the cost of the several products and eliminate the articles which may not be profitably marketed. Instead of attempting to make these calculations currently, it becomes possible to set up a schedule covering each group of products and thereby greatly reduce the clerical work, as the schedules may be kept up to date from the information disclosed by the operation records.

The cost records should be tied in with the books of account through the transfer of the amounts of variance into a reserve account which, at the end of the fiscal period, should be written off

(Exhibit 6.)
EARNED BURDEN.

Month of

Process	Rate	Hours	Earned	Hours	Earned	Hours	Earned	Hours	Earned	Hours	Earned	Hours	Earned
Grey Storage													
Singe;													
Bleach; Kiers													
" Open													
White Driers													
White Tenter													
White Winders													
Printing													
Total.													
Amount Earned													
" Budgeted.													
Operation Variance													

(Exhibit 7.)
OPERATING BUDGET REPORT. Month of

Process.	LABOR			BURDEN			MATERIAL.		
	Standard	Actual	Variance	Standard	Actual	Variance	Standard	Actual	Variance.
Grey Storage									
Singe;									
Bleach; Kiers									
" Open									
White Driers									
White Tenter									
White Winders									
Printing									
Total.									

in the profit and loss account. This information should be obtained from the following reports, each of which should serve a very valuable purpose in the management's control of cost.

Budgeted Expense (Exhibit 1)
Earned Burden (Exhibit 6)
Operating Budget Report (Exhibit 7)

In addition to the variances appearing on these reports, it will be necessary to include the amount due to the fluctuation in cost of direct materials, from the standard prices, as ascertained from the purchase records, and the amount of variance in connection with the rehandling expense.

We have previously referred to the necessity of isolating the cost of idle equipment and to the method of setting a standard basis of operation for each of the process centers. As the operation record (Exhibit 3) compares the percentage of actual operation to the standard, the points at which the variations occur may be readily ascertained, so that the total variance may be calculated as shown by the earned burden report. (Exhibit 6).

The operating budget report (Exhibit 7) constitutes a flexible budget as the amounts appearing as standards are all arrived at through evaluation of actual production, thereby allowing for a definite comparison of the actual operating expenses against comparable objectives. The information is subdivided into the three classes of expense pertinent to each process center and provides a very comprehensive index of the operating efficiency. The labor variance shows the amount of payroll variation from standard. The burden variance is the difference between the amount charged at the machine rates, and production earnings, at standard. The material variation covers the actual consumption cost in comparison with the amount of allowed consumption.

With the many ramifications coincident to the subject, it would be rather difficult to cover the entire cost accounting procedure, and this discussion therefore has been limited to a general description of the important elements, emphasizing that the essential purpose of the cost calculation is the control and reduction of expense.

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OUR OPEN FORUM

"Mine Accounting" by Jesse L. Maury, published October 15, 1932, is one of the best papers I have had the pleasure of reading on that subject.

There are many publications issued covering accounting but it is hard to find anything published that goes into the detail of mine accounting as it is done by our Western mines, especially the metal mines.

I wish to compliment Mr. Maury on the thoroughness with which he goes into the detail of setting up and operating a mine accounting system.

From my experience I would suggest that in addition to the set-up as outlined by Mr. Maury, a carefully planned system of budgets on operation and expense from which standard costs could be developed would make a valuable accounting method for any mine large enough to employ a full time bookkeeper.

We have found the setting of budgets and standards on coal and metal mines the easiest part of our work due to the simplicity of their product.

I had in mind to take exception with Mr. Maury on splitting distributed expense (as illustrated on page 258 under "Milling Ore") any finer than to general mill expense, however, he has undoubtedly had the same experience as most of us, and states further on in his paper that the value of this is doubtful and in most cases it will be found desirable merely to close this account directly to Milling Ore Clearing Account, to which I agree.

Forgetting the more modern developments in Cost Accounting, I will say that Mr. Maury has covered this subject thoroughly along the more or less orthodox methods of Mill and Mine Accounting, and the only improvement I could suggest would be along the line of budgets and standards.

As a matter of curiosity I would like to ask Mr. Maury what he did with the tailings as I note he has no account under Milling to cover Tailings Disposal which leads me to wonder whether his ore is so rich that it makes no tailings, or the mill is located on a nice large river where the tailings can be dumped in and washed away without any trouble from the natives down stream.

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Congratulations on the May first publication of the N. A. C. A.! The two papers on municipal accounting are very good. The Editorial Note in my opinion is not quite correct. The Editor states that municipalities have no problems of manufacturing costs and selling expense. You may be interested to know that not only large cities, but even small cities have many problems of manufacturing. Take, for example, a city that operates a water, gas, or electric utility; it has the same problems as privately-owned utilities. Also, cities have asphalt plants which produce the same kind of asphalt as private plants, and in many of these cities asphalt is sold to private contractors and so it is necessary to know the manufacturing costs in order to set a selling price. The second sentence states that since there is no competition there are not the urgent reasons for wanting accurate costs that exist in industrial establishments. Here again I disagree because we have city manager cities for example where the chief executive is vitally interested in accurate cost data in order to gauge performance of public employees. In other words, cities attempt to get their information equally as accurate as is done in industry.

I also take exception to the second paragraph but to a lesser degree. I do not believe that all public officials are waiting for public opinion to force them to use standard costs. I am willing to admit that this is true in many cases, but I submit that there are cities to which we can point that operate a budgetary control system and manage their affairs in such an excellent manner that it would be a credit to any industry if they could meet the same qualifications.

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